

TOR REMADEVII, A NEW SPECIES OF *TOR* (GRAY) FROM CHINNAR WILDLIFE SANCTUARY,
PAMBAR RIVER, KERALA, SOUTHERN INDIA

B. MADHUSOODANA KURUP^{1,3} AND K.V. RADHAKRISHNAN^{1,2}

¹Kerala University of Fisheries and Ocean Studies, Kochi 682 506, Kerala, India.

²Key Laboratory of Ecology and Environment Science in Guangdong Higher Education, Guangdong Provincial Key Laboratory for Healthy and Safe Aquaculture, College of Life Science, South China Normal University, Guangzhou 510 631, China.

Email: krishnaradh76@gmail.com

³Email: madhukurup@hotmail.com

A new cyprinid fish is described under the genus *Tor* based on 19 specimens collected from Chambakkad and Koottar regions of river Pambar in Chinnar Wildlife Sanctuary. Morphometric and meristic characters of the new species varied from the species hitherto described.

Key words: *Tor remadevii*, Chinnar river, Chinnar WLS, Pambar river

INTRODUCTION

Genus *Tor* (Gray 1834), well-known as Mahseer, is widely distributed in the freshwaters of Asia, Africa and Indo-Australian Archipelago (Tilak and Sharma 1982). The *Tor* species so far reported from Indian region include *Tor khudree* (Sykes), *T. mosal* (Hamilton-Buchanan), *T. mussullah* (Sykes), *T. neilli* (Day), *T. putitora* (Hamilton-Buchanan) and *T. progenius* (McClelland). Mahseer shows different pattern of distribution from the Himalaya to Peninsular region in the Indian subcontinent (Jayaram 1999). *T. kulkarnii* described by Menon (1992) from Deolali hills of Maharashtra is not included as a valid species of the Indian region (Jayaram 1999). Among the various species, *Tor khudree*, *T. mussullah* and *T. tor* are hitherto known from southern India (Kulkarni and Ogale 1979; Kulkarni 1980; Sen and Jayaram 1994; Menon 1999; Ajithkumar *et al.* 2000; Kurup *et al.* 2001; Shaji and Easa 2001). *Tor khudree malabaricus* (Kulkarni 1980) reported from Malabar, Kerala, was subsequently treated as a synonym of *T. khudree* by Menon (1999). During the survey of NAT-ICAR project on Germplasm Inventory Evaluation and Genebanking of Freshwater Fishes of Kerala, we came across 19 specimens of a *Tor* species from the river Pambar, whose morphometric and meristic characters totally varied from the species hitherto described under this genus, and therefore erected as a new species.

MATERIAL AND METHODS

Nineteen specimens were collected using cast net, having 5 mm and 8 mm mesh sizes and gill nets having 32 and 78 mm mesh sizes from the Chambakkad and Koottar localities of river Pambar in Chinnar Wildlife Sanctuary.

Kerala. Morphometric measurements were recorded using a dial reading calliper with an accuracy of 0.1 mm. Morphometry of the new species are presented as percentages, with the range followed by the mean in parentheses. Meristic counts were done following Talwar and Jhingran (1991). Taxonomy of Mahseer fishes under the Genus *Tor* by Menon (1992) was also consulted.

Tor remadevii sp. nov. (Fig.1)

Holotype: Deposited in ZSI (WGRS) CLT. No. V/F 13119a, 331.82 mm TL, Chambakkad, Pambar river, Chinnar Wildlife Sanctuary, 18.v.2004, Coll. Dr. K.V. Radhakrishnan.

Paratype: 2 exs. Deposited in ZSI (WGRS) CLT. No. V/F 13119b, 160.84 mm and 113.64 mm TL, Chambakkad, Pambar river, Chinnar Wildlife Sanctuary, 18.v.2004, Coll. Dr. K.V. Radhakrishnan (16 remaining paratypes ranging from 114.23 mm to 228.16 mm TL are kept at the museum of School of Industrial Fisheries, Cochin University of Science and Technology., Reg. No. SIF/Mus/F/212A to SIF/Mus/F/212B).

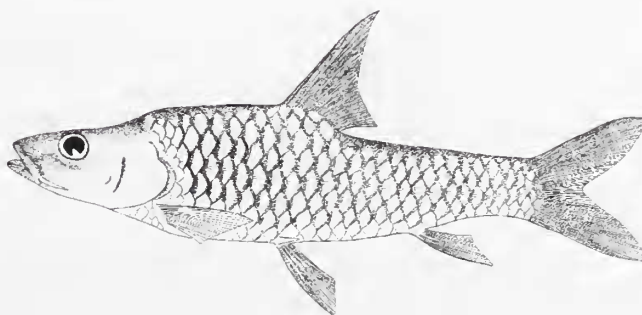


Fig. 1: Lateral view of *Tor remadevii* sp. nov.

Diagnosis: An elongate species with the dorsal fin equal to depth of the body and with a strong osseous spine, head straight, snout pointed and with a terminal or slightly upturned mouth, lips fleshy and the mentum small (fleshy in younger specimens), head length more than body depth, a deep hump at the occiput, lateral line scales 27-29. Body colour greenish to metallic silvery along back and fins reddish with blackish patches.

Description: Based on 19 specimens ranging in size from 113.64 mm to 331.82 mm TL.

D.IV, 10; P.I, 15; V.I, 8; A.I, 5; C.19; L.1. 27-29.

Body: Body elongate. Head length 31.48-33.68% (32.45%) in SL. Depth of the body 84.43-90.10% (83.55%) in head length and 25.60-28.37% (27.09%) in SL. Width of head 39.19-44.89% (41.02%) in head length. Snout elongated and its length 30.45-48.17% (34.33%) in head length and 9.29-16.09% (11.15%) in SL. Eyes lie at the posterior half and superiorly, its diameter is 13.21-23.55% (18.49%) in head length. Dorsal profile has a moderate to prominent hump after the head region, before the insertion of dorsal fin. Two pairs of barbels are present, maxillary more elongated than rostral barbels.

Fins: Origin of dorsal lies opposite to that of pelvics and midway between tip of snout and base of caudal fin. Dorsal spine osseous, strong and smooth, equal to depth of body, forming 96.28-101.24% (99.02%) in the latter, 27.91-30.87% (29.60%) in SL and 88.12-96.04% (91.22%) in head length. Pectoral fins form 60.13-74.73% (67.10%) in height of dorsal fin. Ventral fins are 91.18-99.34% (92.51%) in height of pectoral fins. Caudal fin is deeply forked. Caudal length form 25.87-29.49% (27.54%) in SL. The length of caudal peduncle is 14.42-17.23% (15.60%) in head length. The least depth of caudal peduncle is 68.29-88.67% (74.46%) in its length.

Squamation: 27-29 scales along the lateral line, 4.5 from the origin of dorsal to lateral line, 2.5-3 between the lateral line and pelvic fin origin, predorsal scales 9-11, preventral scales 8 and preanal scales 17-18. Scales between pectoral and ventral fins 8, pelvic and anal fins 9-10. Circumpeduncular scales 14-16.

Coloration: Dorsal side of the body is greenish to metallic black with the sides silvery, ventral side is white. Head is silvery white, while the eyes are dark bluish. Fins are eventually reddish with blackish patches. Body uniformly silvery in colour in younger specimens, belly white and fins red orange.

Distribution: INDIA: Kerala, Chinnar Wildlife Sanctuary, Chambakkad and Koottar localities of river Pambar.

Etymology: Named after the renowned freshwater fish

taxonomist, Dr. K. Rema Devi, Scientist, Zoological Survey of India, Chennai.

KEY TO THE SPECIES OF *TOR* REPORTED FROM THE INDIAN REGION

1. Length of head considerably greater than body depth 2
 - Length of head shorter or more or less equal to body depth 4
2. Dorsal fin inserted midway between tip of snout and caudal fin base, dorsal spine length equal to body depth below it 3
 - Dorsal fin inserted nearer tip of snout than caudal base, dorsal spine length shorter than body depth below it ... *Tor khudree*
3. A characteristic hump over occiput, head and snout straight, mouth slightly upturned, body bluish dark with fins red orange *Tor remadevii* sp. nov.
 - No hump over occiput, Head and snout normal, mouth slightly subterminal, colour silvery with the fins yellowish *Tor putitora*
4. Body deep, 4.5 rows of scales between base of dorsal fin and lateral line. a distinct hump over occiput *Tor mussullah*
 - 3 to 3.5 rows of scales between dorsal fin base and lateral line. No such hump over occiput 5
5. Dorsal spine weak, articulated *Tor neilli*
 - Dorsal spine strong 6
6. Lips hypertrophied. A fan-shaped rounded structure behind upper lip present *Tor progenius*
 - No such fan-shaped structure behind upper lip 7
7. Pre-dorsal scales 6. Dorsal fin inserted midway between tip of snout and caudal fin base. Ventral profile more arched than dorsal (N. India) *Tor tor*
 - Pre-dorsal scales 8. Dorsal fin inserted nearer tip of snout than caudal fin base. Dorsal profile more arched than ventral *Tor mosal*

Other material examined: *Tor putitora*: NBFGR, 1 ex. 186 mm TL.

Remarks: The new species shows remarkable variation from *Tor khudree* and *Tor mussullah*, which are reported from Western Ghats due to the presence of a strong and osseous spine in the dorsal fin and the length of the head, which is more than body depth, a most valid identification character widely used for differentiating various species coming under the genus *Tor*. Also, the dorsal fin is high with its length more or less equal to body depth, a character which differentiates it from that of *Tor tor*. The species, however, shows close similarity with the Himalayan Yellow Fin Mahseer. *Tor putitora* in possessing an elongated head and strong dorsal fin, in contrast, it strongly

Table 1: Comparison of morpho-meristic characters of the new species with the closely related species under the genus, *Tor* in India

Characters	<i>T. remadevii</i>	<i>T. khudree</i>	<i>T. mussullah</i>	<i>T. putiflora</i>	<i>T. progenius</i>	<i>T. tor</i>	<i>T. mosal</i>
HL in SL	2.9-3.2	3.1-3.8	3.9-4.0	3.0-3.6	3.5-3.8	3.5-4.0	3.5-4.0
HL in BD	0.8-0.9	0.9-1.0	1.3-1.5	0.72-0.89	0.9-1.2	1.0-1.3	0.9-1.0
BD in SL	3.5-3.9	3.2-3.8	3.0-3.1	3.4-3.8	3.5-3.8	3.0-3.7	3.3-4.0
Insertion of dorsal fin and caudal base	Midway between snout and caudal base	Nearer to the tip of snout than caudal fin	Nearer to the tip of snout than caudal fin	Midway between snout and caudal base	Equidistant or slightly towards the snout	Equidistant or slightly towards the snout	Equidistant or slightly towards the snout
Scale rows between pelvic fin and lateral line	2.5-3.0	2.5	3.5	2.5	2.5	2.5	2.5
Dorsal profile	With a characteristic hump over occiput	Slightly arched	A hump over occiput	Arched, without a	Moderately arched, characteristic hump	Greatly arched without any hump	Slightly arched
Placement of mouth	Terminal or slightly upturned	Subterminal	Subterminal	Subterminal	Subterminal	Subterminal	Subterminal
Placement of eyes	Anteriorly in the head, not visible from below head	Anteriorly in the head, visible from below head	Anteriorly in the head, visible from below head	Anteriorly in the head, not visible from below head	Anteriorly in the head, visible from below head	Anteriorly in the head, visible from below head	Posteriorly in the head, visible from below head
Eye diameter in HL	5.4	2.7-4.7	5.8-6.0	2.8-5.3	3.0-4.7	3.2-4.1	3.3-4.2
Lateral line scales	27-29	25-27	26-27	25-28	24-27	22-27	23-26
Least height of caudal peduncle in its length	1.13-1.5	1.4-1.5	1.5	1.4-1.8	1.4-1.8	1.4-1.5	1.4-1.6
Last unbranched dorsal fin ray	Strong and osseous. Longer than BD	Weak. Shorter than BD	Strong and smooth. Shorter or equal to BD	Dorsal bony, smooth. Shorter or equal to BD	Shorter than or equal to BD	Strong and smooth. Shorter than BD	Strong and smooth. Shorter than BD
Coloration	Dorsal side greenish to metallic black with sides silvery and on ventral side white	Sides above lateral line creamy yellowish-white and silvery bluish-grey below	Dark with bronzy reflections. Fin rays of caudal and dorsal reddish-grey	Back reddish to sap green. Body below lateral line light orange fading to silvery white. The pectoral, pelvic and caudal fins peacock-green	Specimens preserved in spirit have body above lateral line greyish becoming darker towards the dorsal side. Ventral side of body silvery	Dorsal side greyish green, lateral sides pinkish with greenish-golden above and light olive green below. Dorsal fin reddish and pelvic pectoral and anal fins deep orange	Anteriorly olive yellowish and posteriorly burnt amber in colour. Dorsal fin light reddish-orange and pectoral and pelvic fins yellowish-orange

SL = Standard Length; BD = Body Depth, HL = Head Length

differs from the latter due to the presence of a characteristic hump at the occiput, presence of straight head and snout, and possession of a terminal or slightly upturned mouth in the new species. Conversely in *Tor putitora*, the mouth is subterminal in position and the head profile is also bending downwards. The new species also differ from *Tor mosal* and *Tor kulkarni* (Menon 1992) in a number of characters such as head length in relation to body length, body depth and height of dorsal fin in relation to body depth, and eye diameter and snout length in relation to head length.

ACKNOWLEDGEMENTS

The financial support given by the NAT-ICAR Project for the present study is thankfully acknowledged. Thanks are also due to scientists of ZSI (WGRS) Kozhikkode for help in identifying the new species. We also thank Prof. (Dr.) Ramakrishnan Korakandy, Director, School of Industrial Fisheries, Cochin University of Science and Technology, Kerala, India for providing necessary facilities for carrying out this study. The assistance of M.D. Mahesan and C.P. Sunil Kumar during the field survey is also acknowledged.

REFERENCES

- AJITHKUMAR, C.R., C.R. BIJU & K. RAJU THOMAS (2000): Ecology of hill streams of Western Ghats with special reference to fish community. BNHS Final Report, Bombay Natural History Society. 312 pp.
- GRAY, J.E. (1834): The Illustrations of Indian Zoology, chiefly selected from the collection of General Hardwick. 96 pp.
- JAYARAM, K.C. (1999): The Freshwater Fishes of the Indian Region. Narendra Publishing House, New Delhi. 551+xvii.
- KULKARNI, C.V. & S.N. OGALE (1979): The present status of Mahseer (Fish) and artificial propagation of *Tor kiudree* (Sykes). *J. Bombay Nat. Hist. Soc.* 75(3): 651-660.
- KULKARNI, C.V. (1980): Eggs and early development of *Tor mahseer* Fish. *J. Bombay Nat. Hist. Soc.* 77(1): 70-75.
- KURUP, B.M., T.G. MANOJKUMAR & K.V. RADHAKRISHNAN (2001): Germplasm Inventory, Evaluation and Gene banking of freshwater fishes. NAT-ICAR Research Report. Cochin University of Science and Technology, Cochin, Kerala. 364 pp.
- MENON, A.G.K. (1992): Taxonomy of Mahseer fishes of the Genus *Tor* Gray with description of a new species from Deccan. *J. Bombay Nat. Hist. Soc.* 89(2): 211-228.
- MENON, A.G.K. (1999): Checklist of freshwater fishes of India. *Rec. zool. Surv. India, Occ. Paper No. 175*: 366.
- SEN, T.K. & K.C. JAYARAM (1994): The Mahseer Fishes of India – A Review. *Rec. Zool. Surv. India, Occ. Paper No. 39*: 38.
- SHAJI, C.P. & P.S. EASA (2001): Freshwater Fishes of the Western Ghats. KFRI-NBFGR Publication. 108 pp.
- TALWAR, P.K. & A.G. JHINGRAN (1991): Inland Fishes of India and Adjacent Countries. Oxford & IBH Publishing Co. Ltd., New Delhi. 1158+xix.
- TILAK, R. & V. SHARMA (1982): Game Fishes of India and Angling. International Book Distributors, Dehradun. 304 pp.

